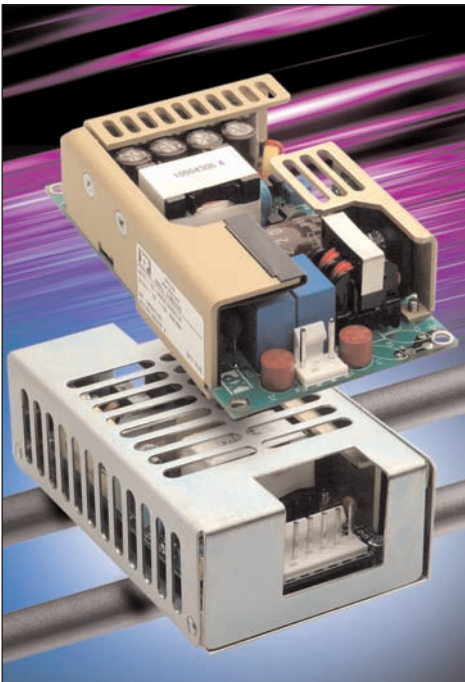


# ECM100 Series



- 100 Watt Models
- Small Size 2.5" x 4.5" x 1.2"
- Low Leakage Current
- Industrial & Medical Approvals
- Convection & Force Cooled Ratings
- Wide Operating Temperature 0 °C to +70 °C
- Level B Conducted Emissions
- EN61000-3-2 Compliant
- Universal AC Input 90-264 VAC
- Input Frequency 47-63 & 440 Hz
- Cover Kits Available
- Mating Connector & Cable Harness Kits Available

Approved for Class I applications, the ECM100 range of single output AC-DC, 100 W power supplies from XP feature the world's smallest footprint for units of these ratings. Size is just 2.5" x 4.5" (63.5 mm x 114.3 mm) and 1.2" (30.48 mm) high. Furthermore, these high-density power supplies meet EN55022 Level B conducted emissions with maximum leakage currents of 100  $\mu$ A at 115 VAC or 200  $\mu$ A at 230 VAC. As a result, these switchers are equally suitable for industrial, IT and medical applications, with no price premium for meeting medical requirements.

The ECM100 series have single output versions from 3.3 V to 48 VDC, adjustable by  $\pm 10\%$ . They are dual-fused for compliance with IEC60601-1 and efficiency is 80-85%, depending upon the model, so minimal excess heat is generated.

The power supplies deliver full power between 0 °C and +50 °C and will operate at up to +70 °C with derating and only 5 CFM of cooling. Comprehensive overvoltage, overload and short circuit protection is built in. Covers, cable harnesses and connector kits are available.



T H E X P E R T S I N P O W E R

## Input Characteristics

| Characteristic            | Minimum                                              | Typical | Maximum | Units | Notes & Conditions         |
|---------------------------|------------------------------------------------------|---------|---------|-------|----------------------------|
| Input Voltage - Operating | 90                                                   |         | 264     | VAC   | 170-370 VDC                |
| Input Frequency           | 47                                                   | 50/60   | 63      | Hz    | 400 Hz operation available |
| Power Factor              |                                                      | 0.62    |         |       | 230 VAC                    |
| Input Current - No Load   |                                                      | 40      |         | mA    | 230 VAC                    |
| Input Current - Full Load |                                                      | 0.9     |         | A     | 230 VAC                    |
| Inrush Current            |                                                      |         | 40      | A     | 230 VAC cold start         |
| Earth Leakage Current     |                                                      |         | 100/200 | μA    | 115/230 VAC                |
| Input Protection          | T3.15 A/250 V internal fuse in both line and neutral |         |         |       |                            |

## Output Characteristics

| Characteristic            | Minimum | Typical | Maximum                                                                    | Units  | Notes & Conditions                                              |
|---------------------------|---------|---------|----------------------------------------------------------------------------|--------|-----------------------------------------------------------------|
| Output Voltage            | 3.3     |         | 48.0                                                                       | VDC    | See Models and Ratings Table                                    |
| Initial Set Accuracy      |         |         | V <sup>1</sup> : ±1. V <sup>2</sup> , V <sup>3</sup> & V <sup>4</sup> : ±5 | %      |                                                                 |
| Output Voltage Adjustment | ±5      |         |                                                                            | %      | 3.3 & 5 V versions                                              |
|                           | ±10     |         |                                                                            |        | All other versions                                              |
| Minimum Load              |         |         |                                                                            | A      | See model tables                                                |
| Start Up Delay            |         |         | 2                                                                          | s      | 90 VAC                                                          |
| Start Up Rise Time        |         |         | 50                                                                         | ms     |                                                                 |
| Hold Up Time              | 16      |         | 75                                                                         | ms     | 115-230 VAC input                                               |
| Drift                     |         |         | ±0.2                                                                       | %      |                                                                 |
| Line Regulation           |         |         | ±0.5                                                                       | %      | 90-264 VAC                                                      |
| Load Regulation           |         |         | ±1                                                                         | %      | Single output versions                                          |
|                           |         |         | V <sup>1</sup> & V <sup>2</sup> : ±1. V <sup>3</sup> & V <sup>4</sup> : ±5 |        | Multi output versions                                           |
| Transient Response        |         |         | 4                                                                          | %      | Recovery to within 1% in less than 500 μs for a 25% load change |
| Ripple & Noise            |         |         | 1                                                                          | %pk-pk | 20 MHz bandwidth                                                |
| Overvoltage Protection    | 115     |         | 135                                                                        | %      | V <sup>1</sup> only. Recycle input to reset                     |
| Overload Protection       | 110     |         | 150                                                                        | %      | Primary power limit, auto-recovery                              |
| Short Circuit Protection  |         |         |                                                                            |        | Trip & restart (Hiccup mode)                                    |
| Temperature Coefficient   |         |         | 0.05                                                                       | %/°C   |                                                                 |

## General Specifications

| Characteristic                      | Minimum | Typical   | Maximum | Units             | Notes & Conditions    |
|-------------------------------------|---------|-----------|---------|-------------------|-----------------------|
| <b>Reliability and Service Life</b> |         |           |         |                   |                       |
| Mean Time Between Failure           |         | 250       |         | kHrs              | MIL-HDBK-217F         |
| <b>Isolation</b>                    |         |           |         |                   |                       |
| Input to Output Test Voltage        | 4000    |           |         | VAC               | Test duration: 1 min  |
| Input to Ground Test Voltage        | 1500    |           |         | VAC               | Test duration: 1 min  |
| Output to Ground Test Voltage       | 500     |           |         | VAC               | Test duration: 1 min  |
| <b>Other Specifications</b>         |         |           |         |                   |                       |
| Efficiency                          |         | 80-85     |         | %                 | See Efficiency Graphs |
| Switching Frequency                 |         | 70        |         | kHz               | Fixed                 |
| Weight                              |         | 0.4 (180) |         | lb (g)            |                       |
| Power Density                       |         |           | 7.40    | W/In <sup>3</sup> |                       |

## Environmental

| Characteristic        | Minimum | Typical | Maximum | Units  | Notes & Conditions       |
|-----------------------|---------|---------|---------|--------|--------------------------|
| Operating Temperature | 0       |         | +70     | °C     | See derating curves      |
| Storage Temperature   | -20     |         | +85     | °C     |                          |
| Cooling               | 5       |         |         | CFM    | For full power operation |
| Humidity              |         |         | 95      | %RH    | Non-condensing           |
| Operating Altitude    |         |         | 3000    | m      |                          |
| Shock                 |         |         | 30      | G peak | Half sine 6 axis         |
| Vibration             |         |         | 2       | G rms  | 5 Hz to 500 Hz, 3 axis   |

## Electromagnetic Compatibility - Immunity

| Phenomenon             | Standard     | Test Level | Criteria | Notes & Conditions |
|------------------------|--------------|------------|----------|--------------------|
| ESD                    | EN61000-4-2  | 2          | B        |                    |
| EFT                    | EN61000-4-4  | 2          | B        |                    |
| Radiated Field         | EN61000-4-3  | 10 V/m     | B        |                    |
| Surges                 | EN61000-4-5  | 3          | B        |                    |
| Conducted              | EN61000-4-6  | 10 V/m     | B        |                    |
| Dips and Interruptions | EN61000-4-11 | 70% Ut     | A        | For 10 ms          |
|                        |              | 40% Ut     | B        | For 100 ms         |

## Electromagnetic Compatibility - Emissions

| Phenomenon        | Standard    | Test Level | Criteria | Notes & Conditions |
|-------------------|-------------|------------|----------|--------------------|
| Conducted         | EN55022/11  | Class B    |          |                    |
| Voltage Flicker   | EN61000-3-3 |            |          |                    |
| Harmonic Currents | EN61000-3-2 | Class A    |          |                    |

## Safety Agency Approvals

| Standard       | Edition                                      |
|----------------|----------------------------------------------|
| EN60950        | 2001                                         |
| UL/cUL 60950   | 3rd Edition                                  |
| UL/cUL 60601-1 | 1st Edition (2003)                           |
| IEC 60950      | IEC 60950 (2001) 1st Edition                 |
| IEC 60601-1    | IEC 60601-1 (1998) 2nd Edition, amd nos. 1&2 |

## Models and Ratings

### Single Output Models

| Output Voltage | Output Current Minimum | Output Current Maximum |        | Ripple & Noise | Model Number |
|----------------|------------------------|------------------------|--------|----------------|--------------|
|                |                        | Convection cooled      | 5 CFM  |                |              |
| +3.3 V         | 0.0 A                  | 15.0 A                 | 20.0 A | 50 mV          | ECM100US03*  |
| +5.0 V         | 0.0 A                  | 15.0 A                 | 20.0 A | 50 mV          | ECM100US05*  |
| +7.0 V         | 0.0 A                  | 11.4 A                 | 14.3 A | 70 mV          | ECM100US07*  |
| +9.0 V         | 0.0 A                  | 8.8 A                  | 11.1 A | 90 mV          | ECM100US09*  |
| +12.0 V        | 0.0 A                  | 7.5 A                  | 8.3 A  | 120 mV         | ECM100US12*  |
| +15.0 V        | 0.0 A                  | 6.0 A                  | 6.6 A  | 150 mV         | ECM100US15*  |
| +18.0 V        | 0.0 A                  | 5.0 A                  | 5.5 A  | 180 mV         | ECM100US18*  |
| +24.0 V        | 0.0 A                  | 4.1 A                  | 4.1 A  | 240 mV         | ECM100US24*  |
| +33.0 V        | 0.0 A                  | 3.0 A                  | 3.0 A  | 330 mV         | ECM100US33*  |
| +48.0 V        | 0.0 A                  | 2.1 A                  | 2.1 A  | 480 mV         | ECM100US48*  |

### Multi Output Models

| Power Max Convection | Power Max 5 CFM | Output 1 | Imin/Imax  | Output 2 | Imin/Imax      | Output 3 | Imin/Imax     | Output 4 | Imin/Imax     | Model Number |
|----------------------|-----------------|----------|------------|----------|----------------|----------|---------------|----------|---------------|--------------|
| 80 W                 | 100 W           | +5.0 V   | 0.0 A/12 A | +12.0 V  | 0.00 A / 3.0 A |          |               |          |               | ECM100UD21*  |
| 80 W                 | 100 W           | +5.0 V   | 0.0 A/12 A | +15.0 V  | 0.00 A / 3.0 A |          |               |          |               | ECM100UD22*  |
| 75 W                 | 100 W           | +5.0 V   | 0.5 A/10 A | +12.0 V  | 0.00 A / 3.0 A | -12.0 V  | 0.0 A / 0.8 A |          |               | ECM100UT31*  |
| 80 W                 | 100 W           | +5.0 V   | 0.5 A/10 A | +24.0 V  | 0.00 A / 2.0 A | -12.0 V  | 0.0 A / 0.8 A |          |               | ECM100UT32*  |
| 80 W                 | 100 W           | +5.0 V   | 0.5 A/10 A | +15.0 V  | 0.00 A / 3.0 A | -15.0 V  | 0.0 A / 0.8 A |          |               | ECM100UT33*  |
| 65 W                 | 100 W           | +3.3 V   | 0.5 A/10 A | +5.0 V   | 0.00 A / 5.0 A | +12.0 V  | 0.0 A / 0.8 A |          |               | ECM100UT34*  |
| 70 W                 | 100 W           | +5.0 V   | 0.5 A/10 A | +3.3 V   | 0.00 A / 5.0 A | +12.0 V  | 0.0 A / 0.8 A |          |               | ECM100UT35*  |
| 80 W                 | 100 W           | +5.0 V   | 0.5 A/10 A | +12.0 V  | 0.00 A / 3.0 A | -5.0 V   | 0.0 A / 0.8 A |          |               | ECM100UT36*  |
| 70 W                 | 100 W           | +5.0 V   | 0.5 A/10 A | +15.0 V  | 0.00 A / 3.0 A | -5.0 V   | 0.0 A / 0.8 A |          |               | ECM100UT37*  |
| 65 W                 | 100 W           | +5.0 V   | 0.5 A/10 A | +3.3 V   | 0.10 A / 5.0 A | +12.0 V  | 0.0 A / 0.8 A | -12.0 V  | 0.0 A / 0.5 A | ECM100UQ41*  |
| 60 W                 | 100 W           | +3.3 V   | 0.5 A/10 A | +5.0 V   | 0.10 A / 5.0 A | +12.0 V  | 0.0 A / 0.8 A | -12.0 V  | 0.0 A / 0.5 A | ECM100UQ42*  |
| 80 W                 | 100 W           | +5.0 V   | 0.5 A/10 A | +24.0 V  | 0.10 A / 2.0 A | +12.0 V  | 0.0 A / 0.8 A | -12.0 V  | 0.0 A / 0.5 A | ECM100UQ43*  |
| 80 W                 | 100 W           | +5.0 V   | 0.5 A/10 A | +24.0 V  | 0.10 A / 2.0 A | +15.0 V  | 0.0 A / 0.8 A | -15.0 V  | 0.0 A / 0.5 A | ECM100UQ44*  |
| 80 W                 | 100 W           | +5.0 V   | 0.5 A/10 A | +12.0 V  | 0.10 A / 3.0 A | -12.0 V  | 0.0 A / 0.8 A | -5.0 V   | 0.0 A / 0.5 A | ECM100UQ45*  |
| 80 W                 | 100 W           | +5.0 V   | 0.5 A/10 A | +15.0 V  | 0.10 A / 3.0 A | -15.0 V  | 0.0 A / 0.8 A | -5.0 V   | 0.0 A / 0.5 A | ECM100UQ46*  |

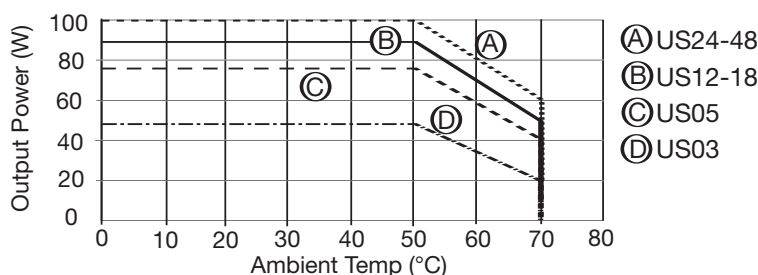
### Notes

1. To receive unit with cover fitted, add suffix '-C' to model number.
2. Output 3 available with opposite polarity for OEM quantities.

3. '\*' denotes ECM100 models are class I operation only.

## Derating Curves

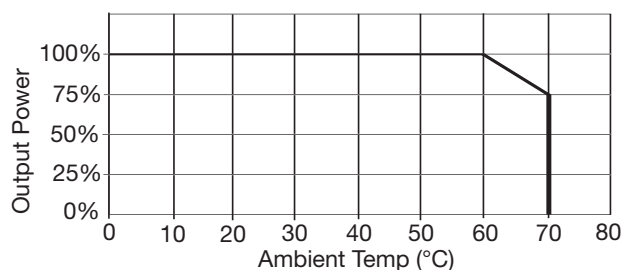
All ECM100 single output models convection cooled



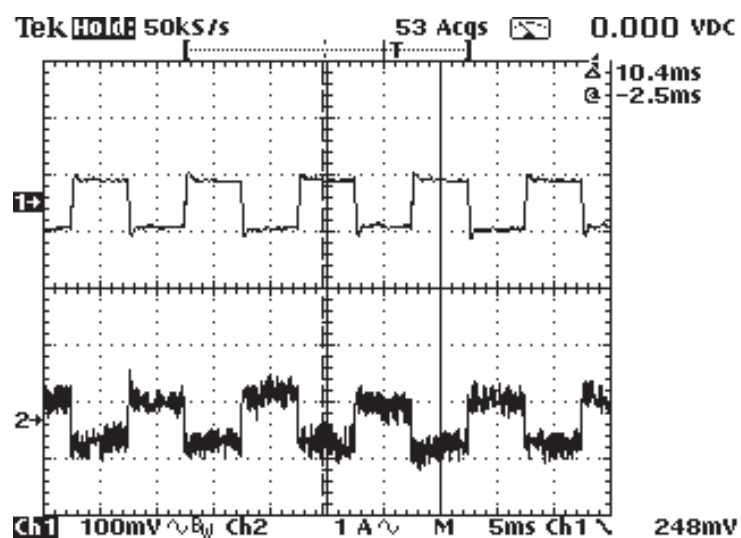
Note:

1. Derate by 10% if cover is fitted.
2. For multi output convection-cooled operation above 50 °C derate linearly to 50% at 70 °C.

All ECM100 models with 5 CFM

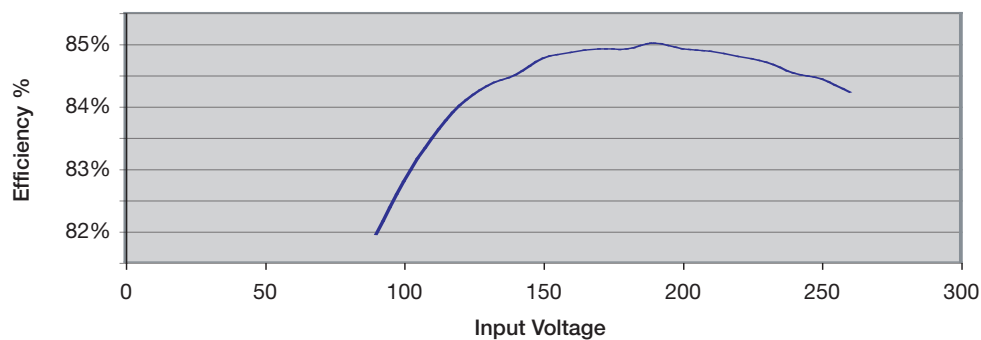


## Transient Response



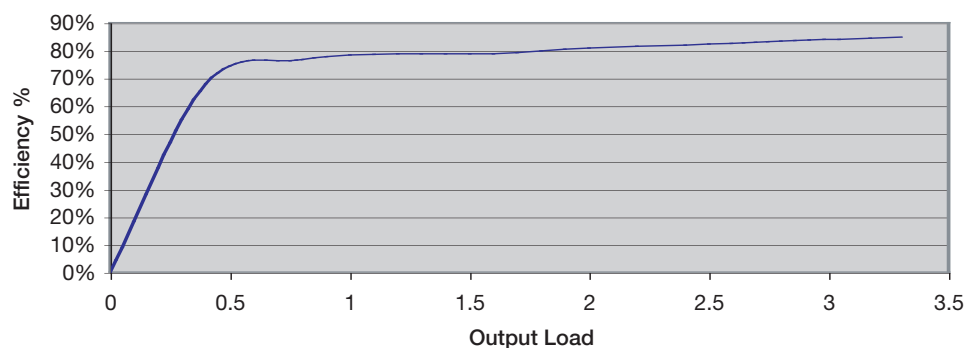
ECM100US24 25% load change

## Efficiency Versus Input Voltage



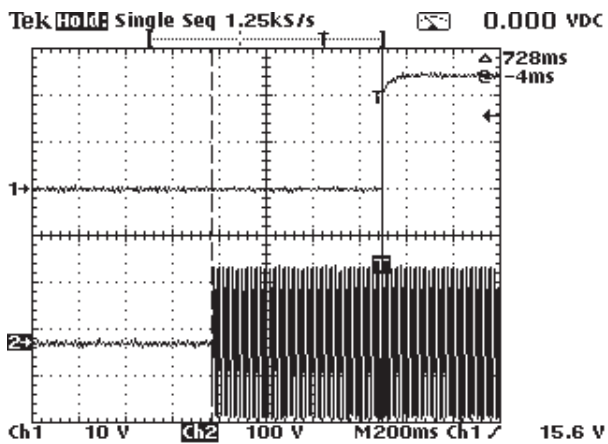
Efficiency shown for ECM100US24

## Efficiency Versus Output Load

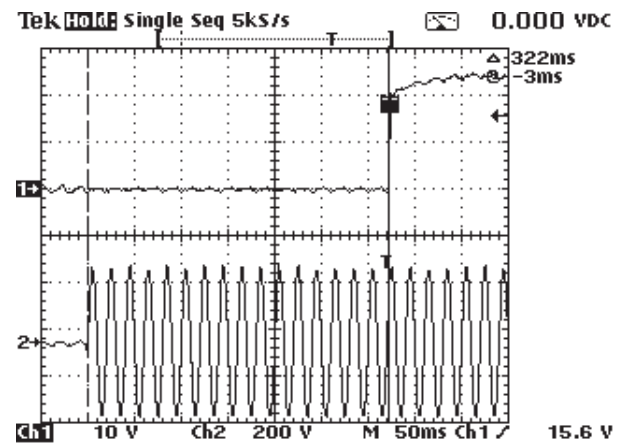


Efficiency shown for ECM100US24

## Start Up Delay

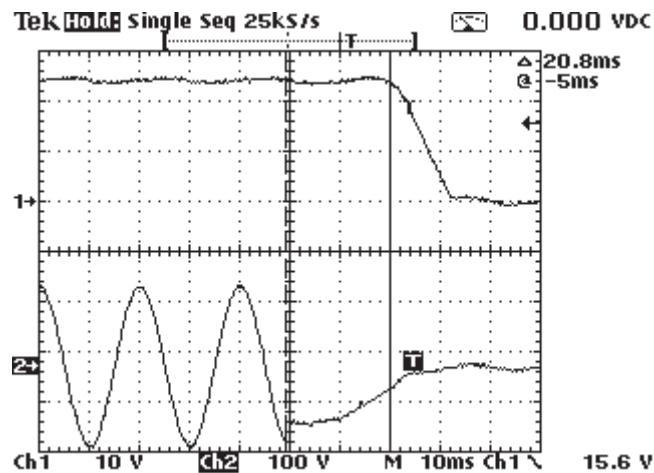


ECM100US24 start up 115 VAC at 100% load



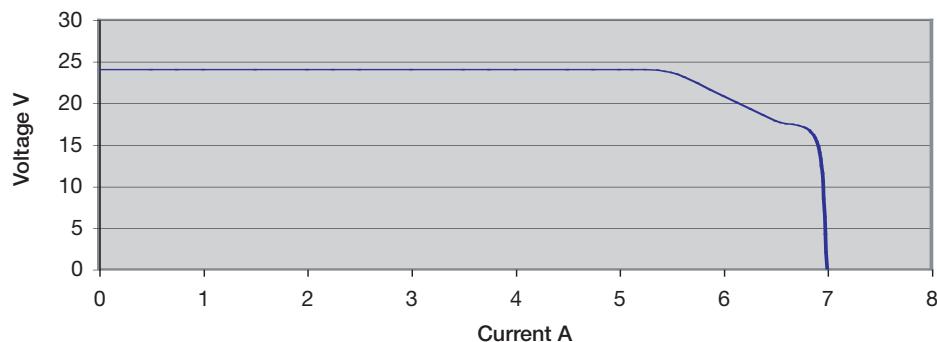
ECM100US24 start up 230 VAC at 100% load

## Hold Up Time



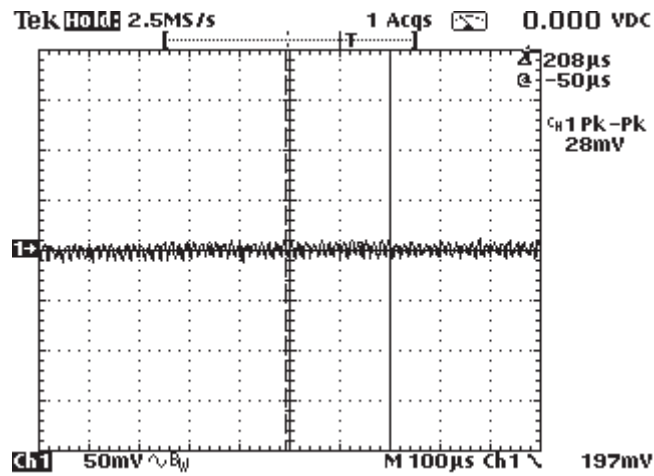
ECM100US24 hold up 115 VAC at 100% load  
 Hold up time is 20.8 ms

## Overload Characteristics



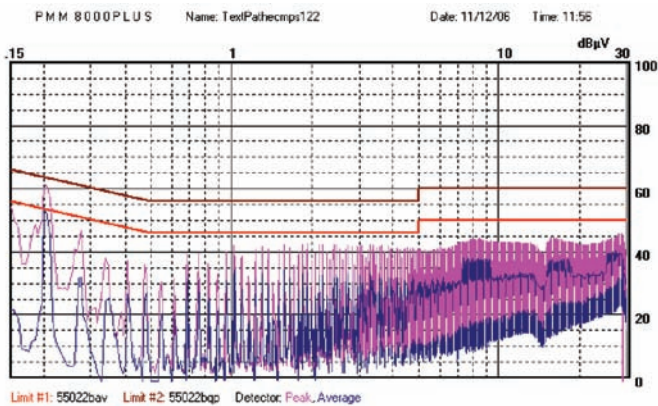
ECM100US24. When current reaches 6.9 A, output goes into trip & restart (Hiccup mode)

## Output Ripple & Noise

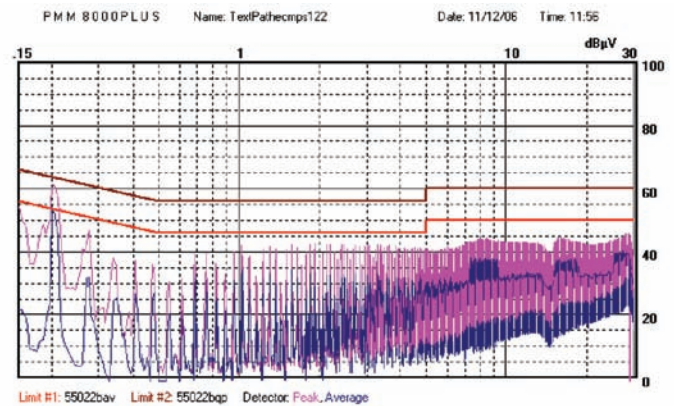


ECM100US24 with 100 W load  
Noise measured is 28 mV

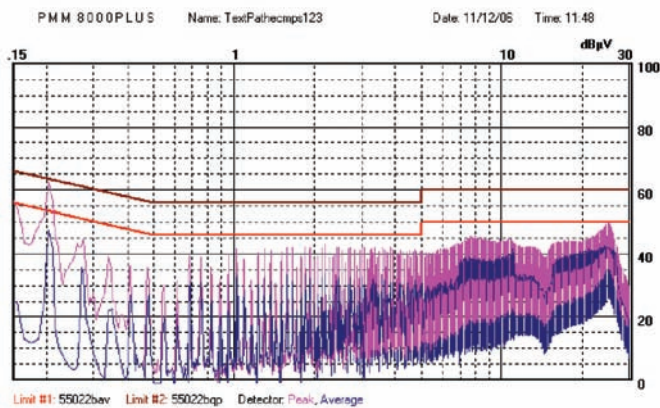
## Conducted Noise



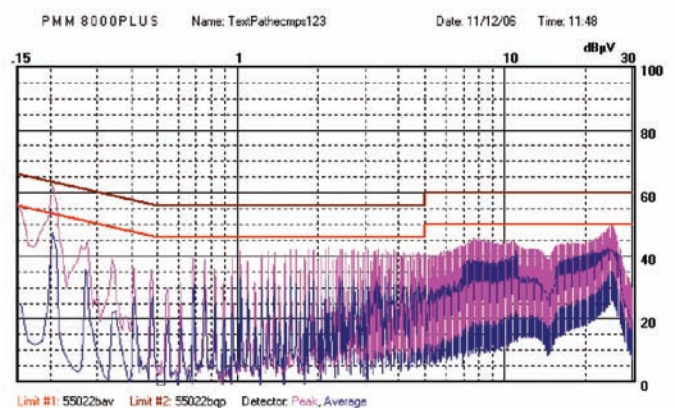
ECM100US12 Class I - Output floating (full load)



ECM100UQ44 Class I - Output floating (full load)



ECM100US12 Class I - Output grounded (full load)

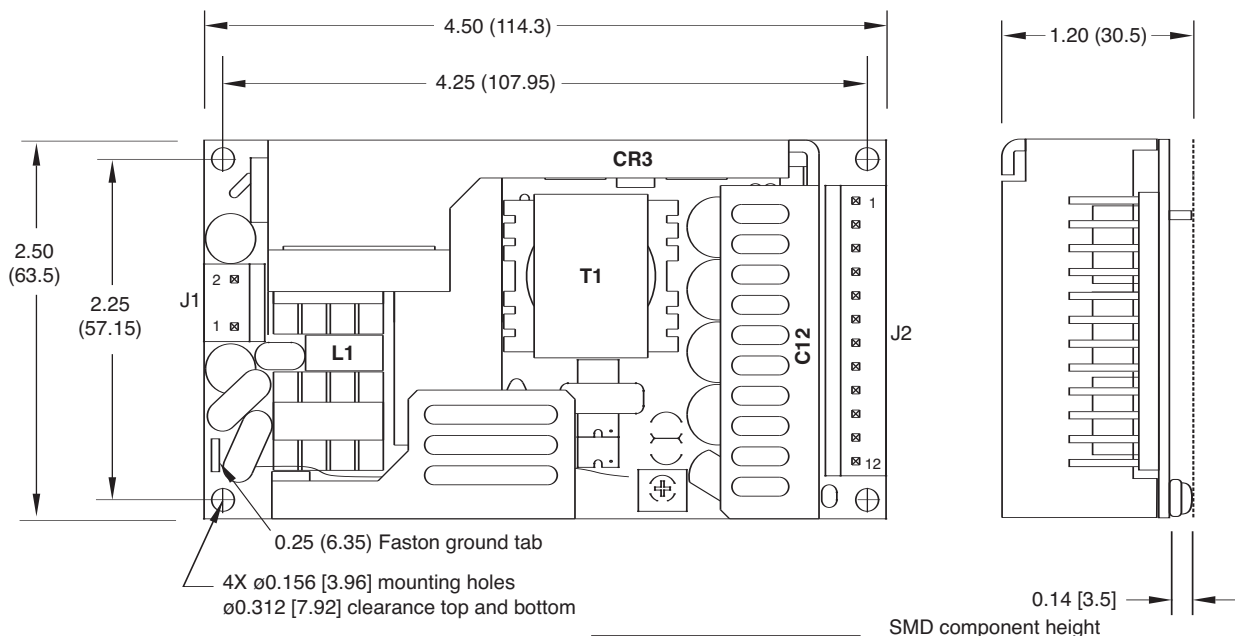


ECM100UQ44 Class I - Output grounded (full load)

## Mechanical Details - Single Output Models

Weight: approx. 0.4 lb (180g)

Cover dimensions are 4.98 x 3.01 x 1.54 (126.5 x 76.4 x 39.0)



| Input Connector J1 |         |
|--------------------|---------|
| Pin 1              | Line    |
| Pin 2              | Neutral |

J1 mates with Molex housing 09-50-3031 and Molex series 2878 crimp terminals. Optional ground (0.25 faston) tab available.

| Output Connector J2 |          |
|---------------------|----------|
| Pin                 | Single   |
| 1                   | +V1      |
| 2                   | +V1      |
| 3                   | +V1      |
| 4                   | +V1      |
| 5                   | V1 RTN   |
| 6                   | V1 RTN   |
| 7                   | V1 RTN   |
| 8                   | V1 RTN   |
| 9                   | NOT USED |
| 10                  | NOT USED |
| 11                  | NOT USED |
| 12                  | NOT USED |

J2 mates with Molex housing 09-50-3121 & Molex series 2878 crimp terminals (2 pt contact) or Molex housing 09-50-8031 & Molex series 6838 crimp terminals (3 pt contact).

### Notes

1. All dimensions in inches (mm). Tolerance .xx =  $\pm 0.02$  (0.50); .xxx =  $\pm 0.01$  (0.25)
2. Cable harness with 300mm wire available. For single output models, order part number ECM100S LOOM.
3. Mating connector kit available. Order part number ECM100 CONKIT.
4. Covers available. Order part number ECM100 COVER.

## Thermal Considerations

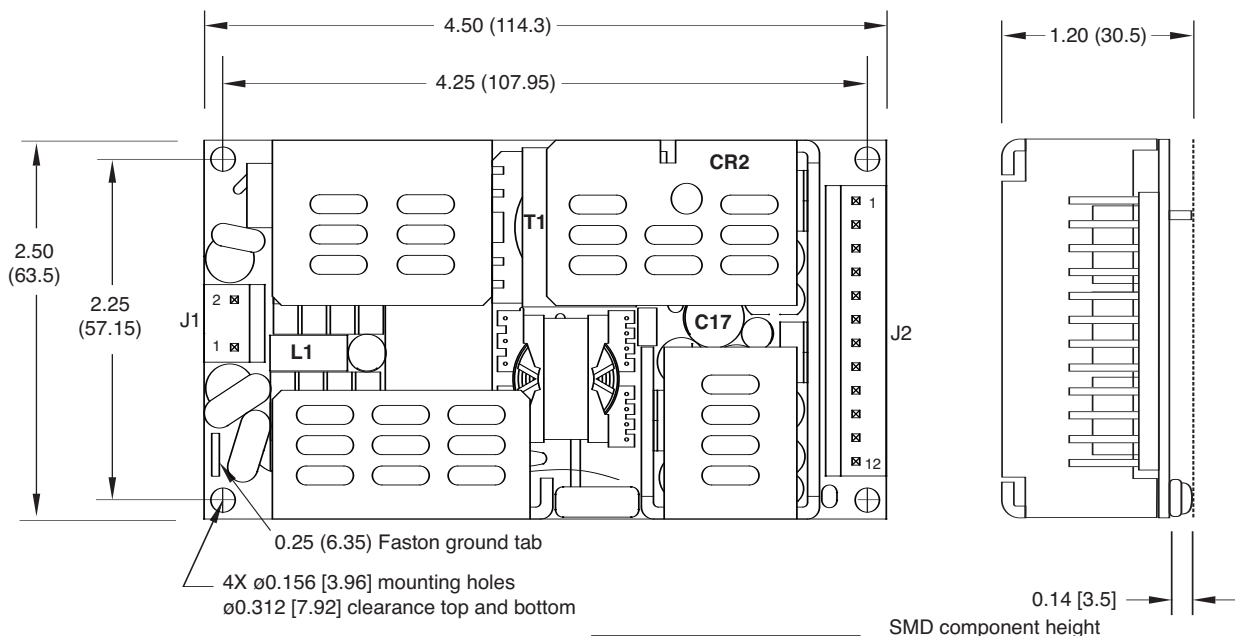
To ensure correct and reliable operation of the PSU, the temperature of the components listed in the table below must not be exceeded. See mechanical details for component locations.

| Component | Maximum Temperature |
|-----------|---------------------|
| L1        | 110 °C              |
| T1        | 110 °C              |
| CR3       | 120 °C              |
| C12       | 95 °C               |

## Mechanical Details - Multi Output Models

Weight: approx. 0.4 lb (180g)

Cover dimensions are 4.98 x 3.01 x 1.54 (126.5 x 76.4 x 39.0)



| Input Connector J1 |         |
|--------------------|---------|
| Pin 1              | Line    |
| Pin 2              | Neutral |

J1 mates with Molex housing 09-50-3031 and Molex series 2878 crimp terminals. Optional ground (0.25 faston) tab available.

| Output Connector J2 |          |
|---------------------|----------|
| Pin                 | Single   |
| 1                   | +V1      |
| 2                   | +V1      |
| 3                   | +V1      |
| 4                   | +V1      |
| 5                   | V1 RTN   |
| 6                   | V1 RTN   |
| 7                   | V1 RTN   |
| 8                   | V1 RTN   |
| 9                   | NOT USED |
| 10                  | NOT USED |
| 11                  | NOT USED |
| 12                  | NOT USED |

### Notes

1. All dimensions in inches (mm). Tolerance .xx =  $\pm 0.02$  (0.50); .xxx =  $\pm 0.01$  (0.25)
2. Cable harness with 300mm wire available. For single output models, order part number ECM100S LOOM.
3. Mating connector kit available. Order part number ECM100 CONKIT.
4. Covers available. Order part number ECM100 COVER.

## Thermal Considerations

To ensure correct and reliable operation of the PSU, the temperature of the components listed in the table below must not be exceeded. See mechanical details for component locations.

| Component | Maximum Temperature |
|-----------|---------------------|
| L1        | 110 °C              |
| T1        | 110 °C              |
| CR2       | 120 °C              |
| C17       | 95 °C               |

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T H E X P E R T S I N P O W E R